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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/650,569	08/30/2000	Joseph E. Geusic	303.390US3	9738

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EXAMINER

MALDONADO, JULIO J

ART UNIT PAPER NUMBER

2823

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/650,569

Applicant(s)

GEUSIC ET AL.

Examiner

Julio J. Maldonado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/24/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39-72 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39, 41, 43-46, 48, 50, 52, 53, 55, 57, 59, 60, 62, 64, 65, 67, 68, 70 and 71 is/are rejected.
- 7) ☒ Claim(s) 40, 42, 47, 49, 51, 54, 56, 58, 61, 63, 66, 69 and 72 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 13, 14. 6) ☐ Other: _____

DETAILED ACTION

1. The non-final rejection as set forth in paper No. 12 is withdrawn in response to applicants' response.
2. A new 103(a) rejection is made as set forth in this Office Action.
3. Claims 39-72 are pending in the application.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 39, 41, 43-46, 48, 50, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaul (U.S. 5,618,752) in view of Haas et al. (U.S. 5,848,214).

Gaul (Fig.2A-2D and Fig.5) in a related method to form an interconnect structure teaches the steps of forming a first functional circuit (201, 202, 214, 226, 227, 228) on a first surface (211) of a semiconductor substrate (210); forming a second functional circuit (222) on a second surface (212) of the semiconductor substrate (210), the second surface (212) of the semiconductor substrate (210) being opposite the first surface (211); forming a hole (215) through the semiconductor substrate (210); and interconnecting the first functional circuit (201, 202, 214, 226, 227, 228) with a second functional circuit (222) wherein the interconnection comprises a wall oxide (216) and polysilicon (217) (column 4, line 48 – column 8, line 33). Also, in another embodiment of the invention (Fig.5), Gaul also teaches forming an optical fiber (344) and

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interconnecting a first (341) and a second (343) functional circuit via the optical fiber (344), wherein the ends of the optical fiber (344) are coupled to the first (341) and second (343) functional circuits by an optical transmitter (346) and an optical receiver (345) (Fig.5 and column 11, line 36-60).

Gaul fails to teach the optical fiber having a cladding layer and a core, wherein the cladding layer so as to surrounds the core and the cladding layer has a first index of refraction, and the core having a second index of refraction that is greater than the first index of refraction. However, Haas et al. (Figs.1-4) in a related method to form an interconnect structure teach forming an interconnection (7) between a first and second functional circuits (14) via an optical fiber (1), wherein the optical fiber (1) comprises a cladding layer (3) and a core (2), said cladding layer (3) surrounds the core (2) having a first index of refraction, and said core (2) having a second index of refraction that is greater than the first index of refraction (Haas et al., column 3, lines 37-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to form an optical fiber as taught by Haas et al. in the interconnection structure of Gaul, since this would confine the optical signal within the fiber (column 3, lines 37-42).

6. Claims 55, 57, 59, 60, 62, 64, 65, 67, 68, 70 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haas et al. ('214) in view of Gaul ('752).

In reference to claims 55, 57, 62, 67 and 68, Haas et al. (Figs.1-4) in a related method to form an interconnect structure teach the steps of forming a first functional circuit on a first surface of a first semiconductor substrate (14); forming a second

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functional circuit on a first surface of a second semiconductor substrate (14); bonding the first and the second semiconductor substrates (14) together; and interconnecting the first and the second functional circuits together via an optical fiber (1) having a cladding layer (3) and a core (2), wherein the cladding layer (3) surrounds the core (2), the cladding layer (3) having a first index of refraction, and the core (2) having a second index of refraction that is greater than the first index of refraction (column 3, line 36 – column 5, line 23).

Haas et al. fail to teach forming a hole through the first semiconductor substrate and the second semiconductor substrate; bonding the first and second semiconductor substrate such that the holes are in alignment; and forming an optical fiber in the hole. However, Gaul (Fig.5) in a related method to form an interconnect structure teaches forming a hole through a semiconductor substrate (342); and forming an optical fiber (344) in the hole (column 11, lines 36-60). Also, Gaul (Fig.4P) in another embodiment of the invention teach forming a hole (320a) on a first semiconductor substrate (335a) and forming a second hole (320b) in a second semiconductor substrate (335b); bonding the first (335a) and second (335b) semiconductor substrates, wherein said bonding is performed such that the holes (320a and 320b) are in alignment (column 11, lines 7-19). Therefore, it would have been obvious to one of ordinary skill in the form the optical fiber as taught by Gaul in the interconnect of Haas et al., since this would improve interconnections between devices (column 11, lines 36-60). It would also have been obvious to one of ordinary skill in the art at the time of the invention was made to bond

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the substrates as taught by Gaul in the interconnect formation method of Haas et al., since this would provide interconnection between devices (column 11, lines 36-60).

In reference to claim 59, 60, 64, 65, 70 and 71, Haas et al. in combination with Gaul teach interconnecting the first and second functional circuit by coupling an optical transmitter to one end of the optical fiber and coupling an optical receiver to the second end of the optical fiber (Haas et al., column 3, line 36 – column 5, line 23).

Allowable Subject Matter

7. Claims 40, 42, 47, 49, 51, 54, 56, 58, 61, 63, 66, 69 and 72 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

Haas et al. (Figs.1-4) in a related method to form an interconnect structure teach the steps of forming a first functional circuit on a first surface of a first semiconductor substrate (14); forming a second functional circuit on a first surface of a second semiconductor substrate (14); bonding the first and the second semiconductor substrates (14) together; and interconnecting the first and the second functional circuits together via an optical fiber (1) having a cladding layer (3) and a core (2), wherein the cladding layer (3) surrounds the core (2), the cladding layer (3) having a first index of refraction, and the core (2) having a second index of refraction that is greater than the first index of refraction (column 3, line 36 – column 5, line 23). However, Haas et al.

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neither teach nor suggest forming a hole in the substrate and forming the optical fiber inside said hole, wherein forming the hole comprises forming an etch pit at a selected location of the first surface of the semiconductor substrate, and performing an anode etch of the first semiconductor substrate to form the hole at the location of the etch pit; forming the optical fiber with a hole running substantially along the center of the optical fiber; and lining the hole with a reflecting mirror prior to forming the cladding layer

Response to Arguments

9. Applicant's arguments with respect to claims 39-72 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via julio.maldonado@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918.

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Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.

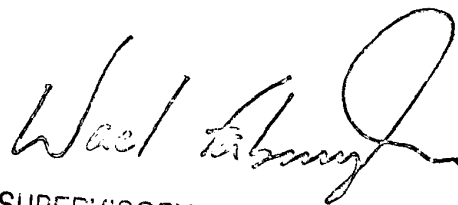
Julio J. Maldonado

Patent Examiner

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703-306-0098

julio.maldonado@uspto.gov

A handwritten signature in black ink, appearing to read 'Wael Alkhatib', is written over a faint, larger signature that appears to be 'Julio J. Maldonado'.

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800